

State of California  
AIR RESOURCES BOARD

**CALIFORNIA REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR  
1998-2000 MODEL MOTOR VEHICLES**

Adopted: April 24, 1996  
Amended: August 5, 1999

NOTE: This document incorporates by reference various sections of the Code of Federal Regulations, some with modifications. California provisions which replace specific federal provisions are denoted by the words "DELETE" for the federal language and "REPLACE WITH" for the new California language. The symbols "\*\*\*\*\*" and "..." mean that the remainder of the federal text for a specific section, which is not shown in these procedures, has been included by reference, with only the printed text changes. Federal regulations which are not listed are not part of the procedures.

## **CALIFORNIA REFUELING EMISSION STANDARDS AND TEST PROCEDURES FOR 1998-2000 MODEL MOTOR VEHICLES**

The following provisions of Title 40, Code of Federal Regulations (CFR), Part 86, Subparts A and B, as adopted or amended by the U.S. Environmental Protection Agency (U.S. EPA) on the date listed, and only to the extent they pertain to the testing and compliance of vehicle refueling emissions for light-duty vehicles and light-duty trucks, are adopted and incorporated herein by this reference as the California Refueling Emission Standards and Test Procedures for 1998-2000 Model Motor Vehicles, except as altered or replaced by the provisions set forth below. With respect to subpart A, where a section has been referenced and is not listed in these test procedures, the reference should be considered to refer to that section's most recent counterpart listed herein.

These refueling test procedures allow the manufacturer to certify using the Federal refueling standards and certification test procedures.

These standards and test procedures are applicable to all new 1998-2000 model gasoline, alcohol, diesel, and hybrid electric passenger cars, light-duty trucks, and medium-duty vehicles with a gross vehicle weight less than 8501 pounds. References to "light-duty trucks" in 40 CFR 86 shall apply both to "light-duty trucks" and "medium-duty vehicles" in these procedures. References to "light-duty vehicles" in 40 CFR 86 shall apply to passenger cars.

In those instances that the testing conditions or parameters are not practical or feasible for such vehicles, the manufacturer shall provide a test plan that provides equal or greater confidence in comparison to these test procedures. The test plan must be approved in advance by the Executive Officer.

Any reference to vehicle sales throughout the United States shall mean vehicle sales in California, except when certifying to the refueling standards, in which case, vehicle sales shall mean throughout the United States.

Regulations concerning U.S. EPA hearings, U.S. EPA inspections, specific language on the Certificate of Conformity, evaporative emissions high-altitude vehicles and testing, alternative useful life, selective enforcement audit and heavy-duty engines and vehicles shall not be applicable to these procedures, except where specifically noted.

**PART 86-CONTROL OF AIR POLLUTION FROM NEW AND IN-USE MOTOR VEHICLES AND NEW AND IN-USE MOTOR VEHICLE ENGINES: CERTIFICATION AND TEST PROCEDURES**

86.1 Reference materials. September 21, 1994.

**Subpart A - General Provisions for Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles, Light-Duty Trucks, and Heavy-Duty Engines, and for 1985 and Later Model Year New Gasoline-Fueled and Methanol-Fueled Heavy-Duty Vehicles.**

86.094-1 General applicability. January 12, 1993.

\* \* \* \* \*

(e) DELETE

REPLACE WITH:

(e) *Small volume manufacturers.* Special certification procedures are available for any manufacturer whose projected combined California sales of passenger cars, light-duty trucks, medium-duty vehicles and heavy-duty engines in its product line (including all vehicles and engines imported under the provisions of §§85.1505 and 85.1509 of this chapter) are fewer than 3,000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive years. To certify its product line under these optional procedures, the small-volume manufacturer must first obtain the Executive Officer's approval. The manufacturer must meet the eligibility criteria specified in §86.092-14(b) before the Executive Officer's approval will be granted. The small-volume manufacturer's certification procedures are described in §86.092-14.

86.098-2 Definitions. April 6, 1994.

ADD:

The definitions in sections 1900 and 2112, Title 13, California Code of Regulations, are hereby incorporated into this test procedure by reference. For purposes of this test procedure and section 1978 of Title 13, California Code of Regulations, "small volume manufacturer" shall mean any vehicle manufacturer with California sales less than or equal to 3000 new vehicles per model year based on the average number of vehicles sold by the manufacturer in the previous three consecutive model years. ...

\* \* \* \* \*

**"Administrator"** means the Executive Officer of the Air Resources Board (ARB).

**"Alcohol fuel"** means either methanol or ethanol as those terms are defined in these test procedures.

**"Battery assisted combustion engine vehicle"** means any vehicle which allows power to be delivered to the driven wheels solely by a combustion engine, but which uses a battery pack to store energy which may be derived through remote charging, regenerative braking, and/or a flywheel energy storage system or other means which will be used by an electric motor to assist in vehicle operation.

**"Battery pack"** means any electrical energy storage device consisting of any number of individual battery modules which is used to propel electric or hybrid electric vehicles.

**"Certificate of Conformity"** means Executive Order certifying vehicles for sale in California.

**"Certification"** means certification as defined in Section 39018 of the Health and Safety Code.

**"Certification level"** means the official exhaust or evaporative and/or refueling emission result from an emission-data vehicle which has been adjusted by the applicable mass deterioration factor and is submitted to the Executive Officer for use in determining compliance with an emission standard for the purpose of certifying a particular engine family.

**"Continually regenerating trap oxidizer system"** means a trap oxidizer system that does not utilize an automated regeneration mode during normal driving conditions for cleaning the trap.

**"Conventional gasoline"** means any certification gasoline which meets the specifications of 86.113-94(a), 40 CFR 86.

**"Dedicated Ethanol Vehicle"** means any ethanol-fueled motor vehicle that is engineered and designed to be operated solely on ethanol.

**"Dedicated Methanol Vehicle"** means any methanol-fueled motor vehicle that is engineered and designed to be operated solely on methanol.

**"Defeat Device"** means an auxiliary emission control device (AECD) that reduces the effectiveness of the emission control system under conditions which may reasonably be expected to be encountered in normal vehicle operation and use, unless (1) such conditions are substantially included in the Federal emission test procedure, (2) the need for the AECD is justified in terms of protecting the vehicle

against damage or accident, or (3) the AECD does not go beyond the requirements of engine starting.

**"Diesel"** DELETE

REPLACE WITH:

**"Diesel Engine"** means any engine powered with diesel fuel, gaseous fuel, ethanol, or methanol for which diesel engine speed/torque characteristics and vehicle applications are retained.

**"Diesel-cycle"** means powered by an engine where the primary means of controlling power output is by limiting of the amount of fuel that is injected into the combustion chambers of the engine.

\* \* \* \* \*

**"Dual-fuel vehicle"** means any motor vehicle that is engineered and designed to be capable of operating on gasoline or diesel and on compressed natural gas or liquefied petroleum gas, with separate fuel tanks for each fuel on-board the vehicle.

**"Electric vehicle"** means any vehicle which operates solely by use of a battery or battery pack. This definition also includes vehicles which are powered mainly through the use of an electric battery or battery pack, but which use a flywheel that stores energy produced by the electric motor or through regenerative braking to assist in vehicle operation.

**"Element of Design"** means any control system (i.e., computer software, electronic control system, emission control system, computer logic), and/or control system calibrations and/or the results of systems interaction, and/or hardware items on a motor vehicle or motor vehicle engine.

**"Ethanol"** means any fuel for motor vehicles and motor vehicle engines that is composed of either commercially available or chemically pure ethanol ( $\text{CH}_3\text{CH}_2\text{OH}$ ) and gasoline as specified in section 86.113-90 (Fuel Specifications) of these test procedures. The required fuel blend is based on the type of ethanol-fueled vehicle being certified and the particular aspect of the certification procedure being conducted.

**"Ethanol vehicle"** means any motor vehicle that is engineered and designed to be operated using ethanol as a fuel.

\* \* \* \* \*

**"Flexible fuel vehicle"** DELETE

REPLACE WITH:

**"Fuel-flexible vehicle (FFV)"** means any methanol-fueled or ethanol-fueled motor vehicle that is engineered and designed to be operated using any gasoline-methanol or gasoline-ethanol fuel mixture or blend.

**"Fuel fired heater"** means a fuel burning device which creates heat for the purpose of warming the passenger compartment of a vehicle but does not contribute to the propulsion of the vehicle.

**"Heavy light-duty truck"** DELETE

**"Hybrid electric vehicle"** or **"HEV"** means any vehicle which is included in the definition of a "series hybrid electric vehicle," a "parallel hybrid electric vehicle," or a "battery assisted combustion engine vehicle".

**"Incomplete vehicle"** means any vehicle which does not have the primary load carrying device or container attached. In situations where individual marketing relationships makes the status of the vehicle questionable, the Executive Officer shall determine whether a specific model complies with the definition of incomplete vehicle.

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**"Intermediate Temperature Cold Testing"** means testing done pursuant to the driving cycle and testing conditions contained in 40 CFR Part 86 Subpart C, at temperatures between 25°F (-4°C) and 68°F (20°C).

**"Intermediate volume manufacturer"** is any vehicle manufacturer with California sales between 3,001 and 35,000 new light- and medium-duty vehicles per model year based on the average number of vehicles sold by the manufacturer each year from 1989 to 1993; however, for manufacturers certifying for the first time in California, model-year sales shall be based on projected California sales.

**"Light-duty truck 1"** DELETE

**"Light-duty truck 2"** DELETE

**"Light-duty truck 3"** DELETE

**"Light-duty truck 4"** DELETE

**"Light light-duty truck"** DELETE

**"Low-emission vehicle" or "LEV"** means any vehicle certified to low-emission standards.

**"Methane Reactivity Adjustment Factor"** means a factor applied to the mass of methane emissions from natural gas fueled vehicles for the purpose of determining the gasoline equivalent ozone-forming potential of the methane emissions.

**"Methanol"** means any fuel for motor vehicles and motor vehicle engines that is composed of either commercially available or chemically pure methanol ( $\text{CH}_3\text{OH}$ ) and gasoline as specified in section 86.113-94 (Fuel Specifications) of these procedures. The required fuel blend is based on the type of methanol-fueled vehicle being certified and the particular aspect of the certification procedure being conducted.

**"Methanol-fueled"** DELETE

REPLACE WITH:

**"Methanol vehicle"** means any motor vehicle that is engineered and designed to be operated using methanol as a fuel.

**"Natural gas"** means either compressed natural gas or liquefied natural gas.

**"Natural gas vehicle"** means any motor vehicle that is engineered and designed to be operated using either compressed natural gas or liquefied natural gas.

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**"Non-methane organic gas" (or "NMOG")** means the sum of non-oxygenated and oxygenated hydrocarbons contained in a gas sample as measured in accordance with the "California Non-Methane Organic Gas Test Procedures" as adopted July 12, 1991 and last amended September 22, 1993.

**"Non-regeneration emission test"** means a complete emission test which does not include a regeneration.

**"Organic material non-methane hydrocarbon equivalent" (or "OMNMFHCE")** for methanol-fueled vehicles means the sum of the carbon mass contribution of non-oxygenated hydrocarbons (excluding methane), methanol, and formaldehyde as contained in a gas sample, expressed as gasoline-fueled hydrocarbons. For ethanol-fueled vehicles, "organic material non-methane hydrocarbon equivalent" (or "OMNMFHCE") means the sum of carbon mass contribution of non-oxygenated hydrocarbons (excluding methane), methanol, ethanol, formaldehyde and acetaldehyde as contained in a gas sample, expressed as gasoline-fueled hydrocarbons.

**"Otto-cycle"** DELETE

REPLACE WITH:

**"Otto-cycle"** means powered by an engine where the primary means of controlling power output is by limiting the amount of air and fuel which can enter the combustion chambers of the engine. Gasoline-fueled engines are Otto-cycle engines.

**"Ozone deterioration factor"** means a factor applied to the mass of NMOG emissions from TLEVs, LEVs, or ULEVs which accounts for changes in the ozone-forming potential of the NMOG emissions from a vehicle as it accumulates mileage.

**"Parallel hybrid electric vehicle"** means any vehicle which allows power to be delivered to the driven wheels by either a combustion engine and/or by a battery powered electric motor.

**"Periodically regenerating trap oxidizer system"** means a trap oxidizer system that utilizes, during normal driving conditions for cleaning the trap, an automated regeneration mode which can be easily detected.

\* \* \* \* \*

**"Regeneration"** means the process of oxidizing accumulated particulate matter. It may occur continually or periodically.

**"Regeneration emission test"** means a complete emission test which includes a regeneration.

**"Regeneration interval"** means the interval from the start of a regeneration to the start of the next regeneration.

\* \* \* \* \*

**"Series hybrid electric vehicle"** means any vehicle which allows power to be delivered to the driven wheels solely by a battery powered electric motor, but which also incorporates the use of a combustion engine to provide power to the battery and/or electric motor.

**"Transitional low-emission vehicle"** or **"TLEV"** means any vehicle certified to transitional low-emission standards.



**"Trap oxidizer system"** means an emission control system which consists of a trap to collect particulate matter and a mechanism to oxidize the accumulated particulate.

**"Type A hybrid electric vehicle"** means a hybrid electric vehicle which achieves a minimum range of 60 miles in the All-Electric Range Test, while maintaining minimal speed and time requirements throughout the test and without use of the auxiliary power unit.

**"Type B hybrid electric vehicle"** means a hybrid electric vehicle which achieves a range of 40 to 59 miles in the All-Electric Range Test, while maintaining minimal speed and time requirements throughout the test and without use of the auxiliary power unit.

**"Type C hybrid electric vehicle"** means a hybrid electric vehicle which achieves a range of 0 to 39 miles in the All-Electric Range Test, while maintaining minimal speed and time requirements throughout the test and without use of the auxiliary power unit, or which has been designated by the manufacturer as having a range of less than 40 miles without the use of the auxiliary power unit. This definition shall also apply to any hybrid electric vehicle which allows the operator to control the time or mode of operation of the auxiliary power unit either directly or indirectly (with the exception that a mechanism which allows the operator only to shut off the auxiliary power unit is permissible for Type A and Type B HEVs), to any hybrid electric vehicle which can be operated solely through the use of the auxiliary power unit, to any hybrid electric vehicle which utilizes a climate control system that cannot be operated without using the auxiliary power unit, and all other types of hybrid electric vehicles, excluding Type A and Type B hybrid electric vehicles.

**"Ultra-low-emission vehicle"** or **"ULEV"** means any vehicle certified to ultra-low emission standards.

**"Useful life"** DELETE

REPLACE WITH:

**"Useful life"** shall have the same meaning as provided in section 2112, Title 13, California Code of Regulations. Approval of vehicles which are not exhaust emissions tested using a chassis dynamometer pursuant to section 1960.1, Title 13, California Code of Regulations shall be based on an engineering evaluation of the system and data submitted by the applicant. The useful life of incomplete medium-duty vehicles certified to the "California Exhaust Emission Standards and Test Procedures for 1987 and Subsequent Model Heavy-Duty Otto-Cycle Engines and Vehicles" shall be defined by the useful life of the medium-duty vehicle engine used in such vehicles.

- 86.098-3 Abbreviations. April 6, 1994.
- 86.084-4 Section numbering; construction. September 25, 1980.
- 86.090-5 General standards; increase in emissions; unsafe conditions. April 11, 1989.
- 86.098-7 Maintenance of records; submitted information; right of entry. April 6, 1994.
- 86.098-8 Emission standards for 1998 and later model year light-duty vehicles.  
April 6, 1994.
- (a) - (b) DELETE
- \* \* \* \* \*
- (e) - (k) DELETE
- 86.099-8 Emission standards for 1999 and later model year light-duty vehicles.  
April 6, 1994.
- (a) - (b) DELETE
- \* \* \* \* \*
- (e) - (k) DELETE
- 86.001-9 Emission standards for 2001 and later model year light-duty trucks.  
April 6, 1994.
- (a) - (b) DELETE
- \* \* \* \* \*
- (e) - (k) DELETE
- 86.004-9 Emission standards for 2004 and later model year light-duty trucks.  
April 4, 1994.
- (a) - (b) DELETE
- \* \* \* \* \*

(e) - (k) DELETE

86.080-12 Alternative certification procedures. April 17, 1980.

86.085-13 Alternative durability program. May 19, 1983.

86.098-14 Small-volume manufacturers certification procedures. April 6, 1994.

\* \* \* \* \*

(b)(1) DELETE

REPLACE WITH:

(b)(1) The optional small-volume manufacturers certification procedures apply to light-duty vehicles (passenger cars, light-duty trucks, and medium-duty vehicles), produced by manufacturers with California sales of fewer than 3,000 units (passenger cars, light-duty trucks, and medium-duty vehicles combined) based on the average number of vehicles sold by the manufacturer in the previous three consecutive years. The optional small-volume manufacturers certification procedures shall not apply to hybrid electric vehicles. All hybrid electric vehicles manufacturers shall be subject to the certification requirements established for hybrid electric vehicles.

(b)(2) DELETE

(b)(3) DELETE

(b)(4) DELETE

(b)(5) DELETE

\* \* \* \* \*

(c)(4) DELETE

REPLACE WITH:

(c)(4) A small-volume manufacturer shall include in its record all of the information that ARB requires in 86.088-21, 86.090-21, 86.091-21, or 86.094-21, including the modifications noted in these test procedures. This information will be considered part of the manufacturer's application for certification and must be submitted to the Executive Officer.

\* \* \* \* \*

(c)(7)(i)(A) DELETE

\* \* \* \* \*

(c)(11)(ii)(D)(1) DELETE

REPLACE WITH:

(c)(11)(ii)(D)(1) The following statement signed by the authorized representative of the manufacturer: "The vehicles (or engines) described herein have been tested in accordance with (list of the applicable subparts A or B) of part 86, Title 40, Code of Federal Regulations, and on the basis of those tests are in conformance with that subpart. All of the data and records required by that subpart are on file and are available for inspection by the Executive Officer. We project the total California sales of vehicles (engines) subject to this subpart (including all vehicles and engines imported under the provisions of 86.1505 and 85.1509 of this chapter) to be fewer than 3,000 units based on the average number of vehicles sold by the manufacturer in the previous three consecutive years."

\* \* \* \* \*

86.094-16 Prohibition of defeat devices. July 17, 1992.

(a) DELETE

REPLACE WITH:

(a) No new passenger car, light-duty truck, or medium-duty vehicle shall be equipped with a defeat device.

\* \* \* \* \*

86.098-17 Emission control diagnostic system for 1998 and later light-duty vehicles and light-duty trucks. April 6, 1994.

DELETE

REPLACE WITH:

The "Malfunction and Diagnostic System Requirements-1994 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines" in section 1968.1, Title 13, California Code of Regulations, is hereby incorporated into this test procedure by reference. For purposes of this test procedure, all references to evaporative system monitoring, malfunction criteria, and MIL illumination and fault code storage shall also apply to refueling systems.

86.085-20 Incomplete vehicles. January 12, 1983.

86.098-21 Application for certification. April 6, 1994.

\* \* \* \* \*

(b)(1)(i) DELETE  
REPLACE WITH:

(b)(1)(i) Identification and description of the vehicles (or engines) covered by the application and a description (including a list and part numbers of all major emission control system parts and fuel system components) of their engine (vehicles only) emission control system and fuel system components, including if applicable, the turbocharger and intercooler. This shall include a detailed description of each auxiliary emission control device (AECD) to be installed in or on any certification test vehicle (or certification test engine).

\* \* \* \* \*

(b)(2) DELETE  
REPLACE WITH:

(b)(2) For 1992 and subsequent model-year TLEVs, LEVs, and ULEVs not certified exclusively on gasoline, projected California sales data and fuel economy data 19 months prior to January 1 of the calendar year with the same numerical designation as the model year for which the vehicles are certified, and projected California sales data for all vehicles, regardless of operating fuel or vehicle emission category, sufficient to enable the Executive Officer to select a test fleet representative of the vehicles (or engines) for which certification is requested at the time of certification.

\* \* \* \* \*

(b)(4)(i) DELETE  
REPLACE WITH:

(b)(4)(i) For passenger cars, light-duty trucks, and medium-duty vehicles, with a GVW less than 8501 pounds, a description of the test procedures to be used to establish the evaporative emission and/or refueling emission deterioration factors, as appropriate, required to be determined and supplied in §86.098-23(b)(2).

\* \* \* \* \*

(g) DELETE  
REPLACE WITH:

(g)(1) For ZEVs and hybrid electric vehicles, the certification application shall include the following:

- (i) Identification and description of the vehicle(s) covered by the application.
- (ii) Identification of the vehicle weight category to which the vehicle is certifying: PC, LDT 0-3750 lbs. LVW, LDT 3751-5750 lbs. LVW, or

MDV (state test weight range), and the curb weight and gross vehicle weight rating of the vehicle.

- (iii) Identification and description of the propulsion system for the vehicle.
- (iv) Identification and description of the climate control system used on the vehicle.
- (v) Projected number of vehicles produced and delivered for sale in California, and projected California sales.
- (vi) For electric and hybrid electric vehicles, identification of the energy usage in kilowatt-hours per mile from the point when electricity is introduced from the electrical outlet and the operating range in miles of the vehicle when tested in accordance with the All-Electric Range Test (see section 9.f. of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in section 1960.1(k), Title 13, California Code of Regulations).
- (vii) If the vehicle is equipped with a fuel fired heater, a description of the control system logic of the fuel fired heater, including an evaluation of the conditions under which the fuel fired heater can be operated and an evaluation of the possible operational modes and conditions under which evaporative emissions can exist. Vehicles which utilize fuel fired heaters which can be operated at ambient temperatures above 40°F or which cannot be demonstrated to have zero evaporative emissions under any and all possible operation modes and conditions shall not be certified as ZEVs.
- (viii) All information necessary for proper and safe operation of the vehicle, including information on the safe handling of the battery system, emergency procedures to follow in the event of battery leakage or other malfunctions that may affect the safety of the vehicle operator or laboratory personnel, method for determining battery state-of-charge, battery charging capacity and recharging procedures, and any other relevant information as determined by the Executive Officer.

\* \* \* \* \*

(j) - (k) DELETE

86.001-21 Application for certification. April 6, 1994.

Amend as noted in 86.098-21 of these test procedures.

- 86.098-22 Approval of application for certification; test fleet selections; determination of parameters subject to adjustment for certification and Selective Enforcement Audit, adequacy limits, and physically adjustable ranges. April 6, 1994.
- 86.001-22 Approval of application for certification; test fleet selections; determinations of parameters subject to adjustment for certification and Selective Enforcement Audit, adequacy of limits, and physically adjustable ranges. April 6, 1994.
- 86.098-23 Required data. April 6, 1994.
- 86.001-23 Required data. April 6, 1994.
- 86.098-24 Test vehicles and engines. April 6, 1994.

\* \* \* \* \*

(a)(1) ... separate engine family. For 1995 and subsequent model-year vehicles or engines, all engines classified in the same engine family shall be certified to identical exhaust emission standards.

\* \* \* \* \*

(b) DELETE

REPLACE WITH:

(b) Emission-data vehicles shall be selected according to the provisions of Appendix II of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." Selection shall be based on highest sales volume and will require only two emission-data vehicles for certification testing per engine family. (For fifty-state families, the reference in the federal procedures to configuration or sales shall mean California configurations and sales rather than total family configurations and sales.) The Executive Officer will accept data from California (or fifty-state) configuration vehicles or from federal vehicles which meet the requirements of subparagraph (f). Federal vehicles may be reconfigured to California versions and tested to show compliance with California emission standards. The Executive Officer will also allow the manufacturer to reconfigure California vehicles.

\* \* \* \* \*

(e)(1) DELETE

REPLACE WITH:

(e)(1) Any manufacturer whose projected California annual sales for the model year in which certification is sought is less than a combined total of 3,000 passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines may request a reduction in the number of test vehicles determined in accordance with the foregoing provisions of this paragraph. The Executive Officer may agree to such lesser numbers as he or she determines would meet the objectives of this procedure.

(e)(2) DELETE

REPLACE WITH:

(e)(2)(i) Any manufacturer may request to certify engine families using assigned DFs for a combined total of 3,000 projected annual California sales of passenger cars, light-duty trucks, medium-duty vehicles, and heavy-duty engines per manufacturer regardless of total sales.

(e)(2)(ii) Assigned DFs shall be used only where specific mileage accumulation data do not exist (i.e., if a vehicle manufacturer uses an engine/system combination where DFs derived from exhaust emission testing exist, then the assigned factors cannot be used).

Assigned DFs shall be used in lieu of data from durability vehicle(s) only when a manufacturer demonstrates that it has control over design specifications, can provide development data, has in-house testing capabilities including accelerated aging of components/systems, and has evaluation criteria to ensure emission control system (ECS) durability for the vehicle's useful life. The applying manufacturer must demonstrate engine durability and that the emission control system(s) developed or adapted for the particular engine will be durable and comply with the applicable emission standards for the engine's or vehicle's useful life. In evaluating any information provided, all relevant test data and design factors shall be considered, including but not limited to: vehicle application, engine design, catalyst loading and volume, space velocity in the catalyst, engine exhaust gas concentrations and catalyst temperatures for various operating modes, and the durability of any emission control system components which may have been used in other vehicle applications. The assigned DFs shall be applied only to entire families.

If emission control parts from other certified vehicles are utilized, then parameter comparisons of the above data must also be provided including part numbers where applicable. Emission control durability may include special in-house specifications.



(e)(2)(iii) The criteria for evaluating assigned DFs for evaporative families are the same as those for exhaust families. However, in determining evaporative family DFs the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles" require that an evaporative family DF be determined by averaging DFs obtained from durability vehicle testing and from bench testing. Therefore, if a manufacturer meets the criteria as specified above in (e)(2)(i) and (e)(2)(ii), the Executive Officer may grant assigned DFs for either (or both) the durability vehicle DF or the bench DF.

Assigned DFs for bench test requirements do not depend upon the 3,000 maximum sales limit. The assigned bench DF is applicable only to evaporative emission control systems which are similar to those used by the manufacturer for 1980 or later model-year vehicles and where an evaporative vehicle DF was determined. In evaluating a request for an assigned bench DF, all relevant information shall be considered, including but not limited to: fuel tank capacity, fuel tank temperatures, carburetor bowl "capacity," underhood temperatures, canister capacity and location, and any other comparisons to the certified application.

(f) ... has previously been submitted.

**ADD:**

The durability or emission data submitted may be from vehicles previously certified by ARB. For 1993 through 1996 model-year passenger cars and light-duty trucks and 1995 through 1997 model-year medium-duty vehicles, the manufacturer shall submit durability data from only California (or fifty-state) configuration vehicles unless the durability data was generated from a vehicle certified by EPA or ARB prior to the 1993 model year (1995 for medium-duty vehicles). For 1997 (1998 for medium-duty vehicles) and subsequent model-year vehicles, durability data shall be submitted from only California (or fifty-state) configuration vehicles. For 1993 and (1995 for medium-duty vehicles) subsequent model-year vehicles, the Executive Officer shall permit the use of federal durability data vehicles if he or she determines that the federal data will adequately represent the durability characteristics of the California configuration. This determination shall be based upon similarity of catalyst location and configuration; similarity of fuel metering system; similarity of major features of emission control system logic and design; and similarity of any other features determined by the Executive Officer to be likely to affect durability. If data from a federal durability data vehicle is used, the requirements of 86.091-28(a)(4)(i)(B) (durability vehicles must meet emission standards) will refer to the federal emissions standards in effect for the model year for which the durability data was generated.

\* \* \* \* \*

(h)(1)(v) ... has previously been submitted.

ADD:

The durability or emission data submitted may be from vehicles previously certified by ARB. For 1993 through 1996 model-year passenger cars and light-duty trucks and 1995 through 1997 model-year medium-duty vehicles, the manufacturer shall submit durability data from only California (or fifty-state) configuration vehicles unless the durability data was generated from a vehicle certified by EPA or ARB prior to the 1993 model year (1995 for medium-duty vehicles). For 1997 (1998 for medium-duty vehicles) and subsequent model-year vehicles, durability data shall be submitted from only California (or fifty-state) configuration vehicles. For 1993 and (1995 for medium-duty vehicles) subsequent model-year vehicles, the Executive Officer shall permit the use of federal durability data vehicles if he or she determines that the federal data will adequately represent the durability characteristics of the California configuration. This determination shall be based upon similarity of catalyst location and configuration; similarity of fuel metering system; similarity of major features of emission control system logic and design; and similarity of any other features determined by the Executive Officer to be likely to affect durability. If data from a federal durability data vehicle is used, the requirements of §86.091-28(a)(4)(i)(B) (durability vehicles must meet emission standards) will refer to the federal emissions standards in effect for the model year for which the durability data was generated.

\* \* \* \* \*

86.001-24 Test vehicles and engines. April 6, 1994.

Amended as noted in 86.098-24 of these test procedures.

86.085-25 Maintenance. July 7, 1986.

(a) DELETE

REPLACE WITH:

(a) Light-duty vehicles. Paragraph (a) of this section applies to passenger cars, light-duty trucks, and medium-duty vehicles.

(a)(1) DELETE

REPLACE WITH:

(a)(1) Scheduled maintenance on the engine, emission control system, and fuel system of durability vehicles shall, unless otherwise provided pursuant to paragraph (a)(5)(iii), be restricted as set forth in the following provisions. If a manufacturer must revise the maintenance schedule, prior approval by the

Executive Officer is required. Unscheduled maintenance must not render a durability vehicle nonrepresentative of the production vehicles. The unscheduled maintenance must not be likely to be required in the normal use of the vehicle. Unauthorized or unjustifiable unscheduled maintenance may be cause for disqualification of a durability vehicle.

Manufacturers must submit durability maintenance logs to the Executive Officer. The maintenance logs shall include the mileage where maintenance occurred, the nature of the maintenance, and the name and part numbers of all fuel system and emission control parts involved with the maintenance. Manufacturers of series hybrid electric vehicles and parallel hybrid electric vehicles shall be required to incorporate into the vehicles a separate odometer or other device subject to the approval of the Executive Officer which can accurately gauge the mileage accumulation on the engines which are used in these vehicles.

\* \* \* \* \*

(a)(1)(i)(A) DELETE

REPLACE WITH:

(a)(1)(i)(A) For Otto-cycle vehicles and hybrid electric vehicles which use Otto-cycle engines, maintenance shall be restricted to the inspection, replacement, cleaning, adjustment, and/or service of the following items at intervals no more frequent than indicated:

- (1) Drive belts on engine accessories (tension adjustment only); (30,000 miles of engine operation).
- (2) Valve lash (15,000 miles of engine operation).
- (3) Spark plugs (30,000 miles of engine operation).
- (4) Air filter (30,000 miles of engine operation).
- (5) Exhaust gas sensor (30,000 miles of engine operation). Provided that:

- (a) The manufacturer shall equip the vehicle with a maintenance indicator consisting of a light or flag, which shall be preset to activate automatically by illuminating in the case of a light or by covering the odometer in the case of a flag the first time the minimum maintenance interval established during certification testing is reached and which shall remain activated until reset. After resetting, the maintenance indicator shall activate automatically when the minimum maintenance interval, when added

to the vehicle mileage at the time of resetting, is again reached and shall again remain activated until reset. When the maintenance indicator consists of a light, it shall also activate automatically in the engine-run key position before engine cranking to indicate that it is functioning. The maintenance indicator shall be located in the instrument panel and shall, when activated, display the words "oxygen sensor" or may display such other words determined by the Executive Officer to be likely to cause the vehicle owner to seek oxygen sensor replacement. The maintenance indicator shall be separate from the malfunction indicator light required by Section 1968, Title 13, California Code of Regulations;

- (b) The manufacturer shall provide free replacement of the oxygen sensor, including both parts and labor, and shall reset the maintenance indicator without any charge, the first time the maintenance interval established during certification testing is reached for vehicles certified with scheduled sensor maintenance before 50,000 miles. If the oxygen sensor is replaced pursuant to the warranty provisions of Section 2037, Title 13, California Code of Regulations, before the first maintenance interval is reached, the manufacturer shall also replace the oxygen sensor and reset the maintenance indicator at the mileage point determined by adding the maintenance interval to the vehicle's mileage at the time of the warranty replacement. If the calculated mileage point for a second oxygen sensor replacement would exceed 50,000 miles, no free second replacement shall be required;
- (c) The maintenance indicator shall be resettable. The maintenance instructions required by §86.085-38 of these procedures shall provide instructions for the resetting of the maintenance indicator, and shall specify that the maintenance indicator shall be reset each time the oxygen sensor is replaced; and
- (d) Notwithstanding the provisions of Section 2037(c), Title 13, California Code of Regulations; the oxygen sensor, including any replacement required pursuant to this section, shall be warranted for the applicable warranty period of the vehicle or engine in accordance with Section 2037(a), Title 13, California Code of Regulations. If such oxygen sensor fails during this period, it shall be replaced by the manufacturer in accordance with Section 2037(d), Title 13, California Code of Regulations.

- (6) Choke (cleaning or lubrication only); (30,000 miles of engine operation).

- (7) Positive crankcase ventilation valve (50,000 miles of engine operation).
  - (8) Ignition wires (50,000 miles of engine operation).
  - (9) In addition, adjustment of the engine idle speed (curb idle and fast idle), valve lash, and engine bolt torque may be performed once during the first 5,000 miles of scheduled driving, provided the manufacturer makes a satisfactory showing that the maintenance will be performed on vehicles in use. For hybrid electric vehicles, these adjustments may only be performed once during the first 5,000 miles of engine operation.
  - (10) Hybrid electric vehicle battery system (manufacturer's established performance limits). Provided that:
    - (a) The manufacturer shall equip the vehicle with a maintenance indicator consisting of a light which shall activate automatically by illuminating the first time the minimum performance level is observed for all battery system components. Possible battery system components requiring monitoring are:
      - i. battery water level
      - ii. temperature control
      - iii. pressure control
      - iv. other parameters critical for determining battery condition
    - (b) The manufacturer shall equip the vehicle with a useful life indicator for the battery system consisting of a light which shall illuminate the first time the battery system is unable to achieve an all-electric operating range (starting from a full state-of-charge) which is at least 75% of the range determined for the vehicle in the All-Electric Range Test (see section 9.f. of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles" as incorporated by reference in §1960.1(k) of Title 13, California Code of Regulations) and submitted in the certification application.
  - (11) Evaporative and/or refueling emission canister(s) (100,000 miles of engine operation).
  - (12) Mechanical fillpipe seal (100,000 miles of engine operation).
- (a)(1)(i)(B) DELETE  
REPLACE WITH:

(a)(1)(i)(B) For diesel vehicles and hybrid electric vehicles which use diesel engines, maintenance shall be restricted to the following items at intervals no more frequently than every 12,500 miles of engine operation, provided that no maintenance may be performed within 5,000 miles of the final test point:

- (1) Adjust low idle speed.
- (2) Adjust valve lash if required.
- (3) Adjust injector timing.
- (4) Adjust governor.
- (5) Clean and service injector tips.
- (6) Adjust drive belt tension on engine accessories.
- (7) Check engine bolt torque and tighten as required.

(ii) DELETE

REPLACE WITH:

(ii) Change of engine and transmission oil, change or service of oil filter and, for diesel vehicles only, change or service of fuel filter and air filter, will be allowed at the mileage intervals specified in the manufacturer's maintenance instructions.

(iii) DELETE

REPLACE WITH:

(iii) Maintenance shall be conducted in a manner consistent with service instructions and specifications provided by the manufacturer for use by customer service personnel.

\* \* \* \* \*

(a)(3) DELETE

(a)(4) DELETE

(a)(5)(iii) ... maintenance will be performed on vehicles in use.

ADD:

(a)(5)(iv) When a part has to be replaced while conducting unscheduled maintenance, a similarly aged part shall be used for those parts that affect emissions, unless it is impractical and unnecessary to age a part and prior approval

has been obtained from the Executive Officer for use of the part without aging. In either case, an engineering report on the nature of the problem with the probable cause and corrective action shall be supplied to the Executive Officer.

\* \* \* \* \*

(b) DELETE

86.098-26 Mileage and service accumulation; emission measurements. April 6, 1994.

(a)(1) DELETE

REPLACE WITH:

(a)(1) Paragraph (a) of this section applies to light-duty vehicles, except ZEVs, which shall be exempt from all mileage and service accumulation, durability-data vehicle, and emission-data vehicle testing requirements.

(a)(2) DELETE

REPLACE WITH:

(a)(2) The procedure for mileage accumulation shall be the Durability Driving Schedule as specified in Appendix IV to Part 86 of the Code of Federal Regulations. A modified procedure may also be used if approved in advance by the Executive Officer. All passenger cars, light-duty trucks, pre-1995 model year medium-duty vehicles, and 1995 model-year vehicles certified to 1994 model-year emission standards shall accumulate mileage at a measured curb weight which is within 100 pounds of the estimated curb weight. All 1995 and subsequent model-year medium-duty vehicles (except those certified to 1994 model-year emission standards) and all 1992 and subsequent medium-duty LEVs and ULEVs shall accumulate mileage at a loaded weight that is within 100 pounds of the average of the vehicle's curb weight and gross vehicle weight. If the vehicle weight is within 100 pounds of being included in the next higher inertia weight class, the manufacturer may elect to conduct the respective emission tests at the higher weight. All mileage accumulation of hybrid electric vehicles shall be conducted with the battery pack at the manufacturer's indicated lowest state-of-charge at the beginning of the test cycle. At no time throughout mileage accumulation shall the battery pack be charged using any off-board charging source.

\* \* \* \* \*

(a)(3)(i)(A) ...

ADD:

The Executive Officer will accept the manufacturer's determination of the mileage at which the engine-system combination is stabilized for emission data testing if (prior to testing) a manufacturer determines that the interval chosen yields emissions performance which is stable and representative of design intent. Sufficient mileage should be accumulated to reduce the possible effects of any emissions variability that is the result of insufficient vehicle operation. Of primary importance in making this determination is the behavior of the catalyst, EGR valve, trap oxidizer or any other part of the ECS which may have non-linear aging characteristics. In the alternative, the manufacturer may elect to accumulate 4,000 mile +/- 250 mile on each test vehicle within an engine family without making a determination.

\* \* \* \* \*

(a)(3)(ii)(A) ...

ADD:

The Executive Officer will accept the manufacturer's determination of the mileage at which the engine-system combination is stabilized for emission data testing if (prior to testing) a manufacturer determines that the interval chosen yields emissions performance which is stable and representative of design intent. Sufficient mileage should be accumulated to reduce the possible effects of any emissions variability that is the result of insufficient vehicle operation. Of primary importance in making this determination is the behavior of the catalyst, EGR valve, trap oxidizer or any other part of the ECS which may have non-linear aging characteristics. In the alternative, the manufacturer may elect to accumulate 4,000 mile  $\pm$  250 mile on each test vehicle within an engine family without making a determination.

\* \* \* \* \*

(a)(4)(i)(A) DELETE

REPLACE WITH:

(a)(4)(i)(A) For Otto-cycle and diesel vehicles and battery assisted combustion engine vehicles which use Otto-cycle or diesel engines:

- (1) Passenger cars, light-duty trucks and medium-duty vehicles certifying to exhaust emissions standards only on a 50,000 mile durability basis and selected by the Executive Officer or elected by the manufacturer under 86.085-24(c)(1), 86.090-24(c)(1), 86.092-24(c)(1), 86.094-24(c)(1), or 86.095-24(c)(1) shall be driven, with all emission control systems installed and operating, for 50,000 miles or such lesser distance as the Executive Officer may agree to as meeting the objective of this procedure.



(2) Prior to initiation of mileage accumulation in a durability-data vehicle, manufacturers must establish the mileage test interval for durability-data vehicle testing of the engine family. Once testing has begun on a durability-data vehicle, the durability test interval for that family may not be changed. At a minimum, multiple tests must be performed at 5,000 miles, 50,000 miles, and the final mileage point as long as they meet the requirements of Appendix III of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles." The Executive Officer will accept durability test interval schedules determined by the manufacturer. The testing must provide a DF confidence level equal to or better than the confidence level using the former fixed mileage test and scheduled maintenance intervals. The procedure for making this determination is also given in Appendix III. The mileage intervals between test points must be approximately of equal length. The  $\pm 250$  mile test point tolerance and the requirement that tests be conducted before and after scheduled maintenance is still mandatory. Emission control systems for Otto-cycle engines which have step function changes designed into the control system must use the 5,000 mile test interval schedule.

(3) Testing before and after scheduled (or unscheduled) maintenance points must be conducted, and these data are to be included in the deterioration factor calculation.

The number of tests before and after scheduled maintenance and the mileage intervals between test points should be approximately equal. Durability test interval schedules with multiple testing at test points within 10,000 miles of or at the 50,000 mile and the final mileage test point must be submitted for approval. Multiple testing at maintenance mileage tests points within 10,000 miles of the 50,000 mile and the final mileage test points may be approved if it can be demonstrated by previously generated data that the emission effects of the maintenance are insignificant.

(4) For engine families which are to be certified to the full useful life emission standards, each exhaust emission durability-data vehicle shall be driven with all emission control systems installed and operating, for the full useful life or such lesser distance as the Executive Officer may agree to as meeting the objective of this procedure. Durability tests shall be at every 5,000 miles, from 5,000 miles to the full useful life, however, the above procedures may be used to determine alternate test intervals subject to the following.

For engine families which are to be certified to the full useful life emission standards, durability vehicles may accumulate less than the full useful life if the manufacturer submits other data or information sufficient to demonstrate that the vehicle is capable of meeting the applicable emission standards for the full useful life. At a minimum, 75% of the full useful life shall be accumulated. For the purpose of conducting mileage accumulation on light-duty hybrid electric vehicles, the full useful life of the auxiliary power unit shall be defined as 50,000 miles for a Type A hybrid electric vehicle, 75,000 miles for a Type B hybrid electric vehicle, and 100,000 miles for a Type C hybrid electric vehicle. For medium-duty hybrid electric vehicles, the full useful life of the auxiliary power unit shall be defined as 60,000 miles for a Type A hybrid electric vehicle, 90,000 miles for a Type B hybrid electric vehicle, and 120,000 miles for a Type C hybrid electric vehicle. Alternative durability plans may also be used if the manufacturer provides a demonstration that the alternative plan provides equal or greater confidence that the vehicles will comply in-use with the emission standards. The demonstration shall include, but not be limited to, bench test data and engineering data. A manufacturer's in-use emission data may also be used. All alternative durability plans, including the use of durability vehicles which accumulate less than the full useful life are subject to approval in advance by the Executive Officer.

(B) For diesel vehicles equipped with periodically regenerating trap oxidizer systems, at least four regeneration emission tests (see 86.106 through 86.145) shall be made. With the advance approval of the Executive Officer, the manufacturer may install (1) a manual override switch capable of preventing (i.e., delaying until the switch is turned off) the start of the regeneration process and (2) a light which indicates when the system would initiate regeneration if it had no override switch. Upon activation of the override switch the vehicle will be operated on a dynamometer to precondition it for the regeneration emission test in accordance with §§86.132-82, or 86.132- 90, 86.129-80, or 86.129.94 of these procedures. The Urban Dynamometer Driving Schedule (UDDS) which is in progress at the time when the light comes on shall be completed and the vehicle shall proceed to the prescribed soak period followed by testing. With the advance approval of the Executive Officer, the manual override switch will be turned off at some predetermined point in the testing sequence permitting the regeneration process to proceed without further manual interaction. The mileage intervals between test points shall be approximately equal. The first regeneration emission test shall be made at the 5,000 mile point. The regeneration emission tests must provide a deterioration factor confidence level equal to or better than the confidence level achieved by performing regeneration emission tests at the following mileage point: 5,000; 20,000; 35,000; and 50,000. The procedure for making this determination is shown in Appendix IV of the "California Exhaust Emission Standards and Test

Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles."

(C) For gasoline-, gaseous-, and alcohol-fueled vehicles, the "California Evaporative Emission Standards and Test Procedures for 1978 and Subsequent Model Motor Vehicles," as incorporated in Title 13, California Code of Regulations, Section 1976, specify evaporative durability testing at 5,000, 10,000, 20,000, 30,000, 40,000 and 50,000 mile test points. These requirements are also applicable to hybrid electric vehicles. With the exception of fuel-flexible vehicles, a manufacturer may conduct evaporative testing at test points used for exhaust emission durability testing provided that the same deterioration confidence level for the evaporative emission DF determination is retained (see Appendix III of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks and Medium-Duty Vehicles.").

(D) For 1993 and 1994 fuel-flexible vehicles which are not certified to TLEV, LEV, or ULEV standards, the test schedule must include exhaust emission tests at 5,000, 10,000, and every 10,000 miles thereafter to the final mileage point using M85 or E85 for methanol and ethanol fuel- flexible vehicles, respectively. Exhaust emission tests shall also be conducted at 5,000 miles, 50,000 miles, and the final mileage point with certification gasoline. For all 1995 and subsequent fuel-flexible vehicles and all 1992 and subsequent fuel-flexible vehicles certifying to TLEV, LEV, or ULEV standards, the test schedule shall include exhaust emission tests at 5,000 miles, 10,000 miles, and every 10,000 miles thereafter to the final mileage point using M85 or E85 and certification gasoline. For all fuel-flexible vehicles, if evaporative emission testing is conducted, exhaust and evaporative emission tests shall also be conducted using M35 or E10, or another approved fuel, at the mileage points where M85 or E85 testing is conducted. The results of these exhaust and evaporative emission tests will be used by the Executive Officer to evaluate the vehicle's emission control deterioration with various fuels (M85, M35, and unleaded gasoline; See Fuel Specifications, §86.113-94 of these procedures). Only the M85 or E85 and certification gasoline exhaust emission results and the M35 or E10 evaporative emission results will be used to determine applicable exhaust and evaporative emission deterioration factors, respectively, as required in §86.091-28 (Compliance with Emission Standards) of these procedures.

(E) The Executive Officer may determine under 86.085-24(f), 86.090- 24(f), 86.092-24(f), 86.094-24(f), or 86.095-24(f), or 86.096-24(f), or 86.098-24(f) that no testing is required.

\* \* \* \* \*

(a)(5)(i) ...

ADD:

In addition, the emission tests performed on emission-data vehicles and durability-data vehicles shall be non-regeneration emission tests for diesel passenger cars, light-duty trucks, and medium-duty vehicles equipped with periodically regenerating trap oxidizer systems. For any of these vehicles equipped with continually regenerating trap oxidizer systems, manufacturers may use the provisions applicable to periodically regenerating trap oxidizer systems as an option.

If such an option is elected, all references in these procedures to vehicles equipped with periodically regenerating trap oxidizer systems shall be applicable to the vehicles equipped with continually regenerating trap oxidizer systems.

\* \* \* \* \*

(a)(8) DELETE

REPLACE WITH:

(a)(8) Once a manufacturer submits the information required in paragraphs (a)(7) of this section for a durability-data vehicle, the manufacturer shall continue to run the vehicle to 50,000 miles if the family is certified to 50,000 mile emission standards or to the full useful life if it is certified to emission standards beyond 50,000 miles (or to a lesser distance which the Executive Officer may have previously agreed to), and the data from the vehicle will be used in the calculations under 86.088-28, 86.090-28, and 86.091-28. Discontinuation of a durability-data vehicle shall be allowed only with the consent of the Executive Officer.

\* \* \* \* \*

(b) DELETE

\* \* \* \* \*

86.001-26 Mileage and service accumulation; emission measurements. April 6, 1994.

Amended as noted in 86.098-26 of these test procedures.

86.090-27 Special test procedures. April 11, 1989.

86.098-28 Compliance with emission standards. April 6, 1994.

(a)(1) DELETE

REPLACE WITH:

(a)(1) Paragraph (a) of this section applies to passenger cars, except ZEVs.

\* \* \* \* \*

(a)(4)(i) DELETE

REPLACE WITH:

(a)(4)(i) Separate emission deterioration factors shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established for exhaust HC (non-alcohol vehicles, non-TLEVs, non-LEVs, and non-ULEVs), exhaust OMHCE or OMNMHCE (alcohol vehicles that are not TLEVs, LEVs, or ULEVs), exhaust NMOG (all TLEVs, LEVs, and ULEVs), exhaust formaldehyde (alcohol vehicles, TLEVs, LEVs, and ULEVs), exhaust CO, exhaust NO<sub>x</sub>, and exhaust particulate (diesel vehicles only) for each engine-system combination. A separate evaporative and/or refueling emission deterioration factor shall be determined for each evaporative/refueling emission family-evaporative emission control system combination from the testing conducted by the manufacturer (gasoline- and alcohol-fueled vehicles only). Separate refueling emission deterioration factors shall be determined for each evaporative/refueling emission family-emission control system combination from the testing conducted by the manufacturer (petroleum-fueled diesel cycle vehicles not certified under the provisions of paragraph (g) of this section only).

Separate emission correction factors (diesel passenger cars, light-duty trucks, and medium-duty vehicles equipped with periodically regenerating trap oxidizer systems only) shall be determined from the exhaust emission results of the durability-data vehicle(s) for each engine-system combination. A separate factor shall be established for exhaust HC (non-alcohol vehicles, non-TLEVs, non-LEVs, and non-ULEVs), exhaust OMHCE or OMNMHCE (alcohol vehicles that are not TLEVs, LEVs, or ULEVs), exhaust NMOG (TLEVs, LEVs, and ULEVs), exhaust CO, exhaust NO<sub>x</sub>, and exhaust particulate for each engine-system combination.

\* \* \* \* \*

(a)(4)(i)(E) The regeneration exhaust emission data (diesel passenger cars, light-duty trucks, and medium-duty vehicles equipped with periodically regenerating trap oxidizer systems only) from the tests required under 86.084-26(a)(4) or 86.090-26(a)(4) shall be used to determine the regeneration exhaust emissions interpolated to the 50,000-mile point. The regeneration exhaust emission results shall be plotted as a function of the mileage on the system, rounded to the nearest mile, and the best fit straight lines, fitted by the method of

least squares, shall be drawn through all these data points. The interpolated 50,000-mile point of this line shall be used to calculate the multiplicative exhaust emission correction factor for each engine-system combination as follows:

$$\text{Factor} = 1 + \frac{(R-1)n}{4505}$$

where, R = the ratio of the regeneration exhaust emissions interpolated to 50,000 miles to the non-regeneration exhaust emissions interpolated to 50,000 miles.

n = the number of complete regenerations which occur during the durability test.

These interpolated values shall be carried out to a minimum of four places to the right of the decimal point before dividing one by the other to determine the correction factor. The results shall be rounded to three places to the right of the decimal point in accordance with ASTM E29-67. For applicability to gaseous emission standards under the 100,000 mile option, R will be determined based upon projected 100,000 mile emissions.

\* \* \* \* \*

(a)(4)(iii) DELETE

REPLACE WITH:

(a)(4)(iii) The emissions to compare with the standard (or the family particulate emission limit, as appropriate) shall be the adjusted emissions of paragraphs (a)(4)(ii)(B) and (C) of this section and 86.094-28 (a)(4)(ii)(A) for each emission-data vehicle. Before any emission value is compared with the standard (or the family particulate limit, as appropriate), it shall be rounded, in accordance with ASTM E29-67 to one significant figure beyond the number of significant figures contained in the standard (or the family particulate emission limit, as appropriate). The rounded emission values may not exceed the standard (or the family particulate emission limit, as appropriate). Fleet average NMOG value calculations shall be rounded, in accordance with ASTM E29-67, to four significant figures before comparing with fleet average NMOG requirements.

\* \* \* \* \*

(b) DELETE

\* \* \* \* \*

(g)(1)(i) DELETE  
REPLACE WITH:

(g)(1)(i) This provision is only available for petroleum diesel fuel.

86.001-28 Compliance with emission standards. April 6, 1994.

Amend as noted in 86.098-28 of these test procedures.

86.004-28 Compliance with emission standards. April 6, 1994.

\* \* \* \* \*

(b) DELETE

\* \* \* \* \*

(g)(1)(i) DELETE  
REPLACE WITH:

(g)(1)(i) This provision is only available for petroleum diesel fuel.

86.091-29 Testing by the Administrator. March 24, 1993.

86.001-30 Certification. April 6, 1994.

86.004-30 Certification. April 6, 1994.

86.098-30 Certification. April 6, 1994.

86.079-31 Separate certification. September 8, 1977.

86.079-32 Addition of a vehicle or engine after certification. September 8, 1977.

86.079-33 Changes to a vehicle or engine covered by certification. September 8, 1977.

86.082-34 Alternative procedures for notification of addition and changes.  
November 2, 1982.

(a) ...

ADD:

A manufacturer must notify the Executive Officer within 10 working days of making an addition of a vehicle to a certified engine family or a change in a vehicle previously covered by certification.

The manufacturer shall also submit, upon request of the Executive Officer, the following items:

- (1) service bulletin.
- (2) driveability statement.
- (3) test log.
- (4) maintenance log.

All running changes and field fixes which do not adversely affect the system durability are deemed approved unless disapproved by the Executive Officer within 30 days of the receipt of the running change or field fix request. A change not specifically identified in the manufacturer's application must also be reported to the Executive Officer if the change may adversely affect engine or emission control system durability. Examples of such changes include any change that could affect durability, thermal characteristics, deposit formation, or exhaust product composition, i.e., combustion chamber design, cylinder head material, camshaft profile, computer modifications, turbocharger, intercooler wastegate characteristics, and transmission or torque converter specifications. Running changes and field fixes meeting the definitions contained in Appendix VI, of the "California Exhaust Emission Standards and Test Procedures for 1988 and Subsequent Model Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles," shall be automatically deemed approved by the Executive Officer, as long as the conditions set forth in Appendix VI are satisfied.

The manufacturer is required to update and submit to the Executive Officer the "supplemental data sheet" for all running changes and field fixes implemented with the change notification. The manufacturer shall submit, on a monthly basis, by engine family, a list of running changes/field fixes giving the document number date submitted and a brief description of the change.

\* \* \* \* \*

- |           |  |
|-----------|--|
| 86.001-35 | Labeling. April 6, 1994.   |
| 86.098-35 | Labeling. April 6, 1994.   |
| 86.079-36 | Submission of vehicle identification numbers. November 14, 1978. |
| 86.085-37 | Production vehicles and engines. January 12, 1983.               |
| 86.085-38 | Maintenance instructions. November 16, 1983.                     |

(a) DELETE



REPLACE WITH:

(a) The manufacturer shall furnish or cause to be furnished to the purchaser of each new motor vehicle subject to the standards prescribed in §§86.098-8, 86.099-8, 86.001-9, or 86.004-9 of these procedures, written instructions for the maintenance and use of the vehicle by the purchaser as may be reasonable and necessary to assure the proper functioning of emission control systems in normal use. Such instructions shall be consistent with and not require maintenance in excess of the restrictions imposed under subparagraph 86.085-25(a)(1) as amended above, except that the instructions may, subject to approval by the Executive Officer, require additional maintenance for vehicles operated under extreme conditions. In addition, subject to approval by the Executive Officer, the instructions may require inspections necessary to insure safe operation of the vehicle in use.

In addition to any maintenance which may be required pursuant to the preceding paragraph, the instructions may also recommend such inspections, maintenance, and repair as may be reasonable and necessary for the proper functioning of the vehicle and its emission control systems. If the instructions recommend maintenance in addition to that which may be required pursuant to the preceding paragraph, they shall distinguish clearly between required and recommended maintenance.

\* \* \* \* \*

(c)(1) DELETE

REPLACE WITH:

(c)(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under subparagraph 86.085- 25(a)(1).

\* \* \* \* \*

(d)(1) DELETE

REPLACE WITH:

(d)(1) Such instructions shall specify the performance of all scheduled maintenance performed by the manufacturer under subparagraph 86.085- 25(a)(1).

\* \* \* \* \*

86.079-39      Submission of maintenance instructions. September 8, 1977.

(a) DELETE

REPLACE WITH:

(a) The manufacturer shall provide to the Executive Officer, no later than the time of the submission required by paragraph 86.088-23, 86.091-23, or 86.094-23, a copy of the maintenance instructions which the manufacturer proposes to supply to the ultimate purchaser in accordance with subparagraph 86.085-38(a). The Executive Officer will review such instructions to determine whether they are consistent with California requirements, and to determine whether the instructions for required maintenance are consistent with the restrictions imposed under subparagraph 86.085-25(a)(1). The Executive Officer will notify the manufacturer of his or her determinations.

\* \* \* \* \*

**Subpart B - Emission Regulations for 1977 and Later Model Year New Light-Duty Vehicles and New Light-Duty Trucks; Test Procedures.**

86.101 General applicability. April 6, 1994.

86.102 Definitions. March 5, 1980.

DELETE

REPLACE WITH: The definitions in subpart A, as modified in these procedures, apply to this subpart.

86.103 Abbreviations. March 5, 1980.

86.104 Section numbering, construction. April 11, 1989.

86.105 Introduction; structure of subpart. April 6, 1994.

86.106-96 Equipment required; overview. March 24, 1993.

86.107-98 Sampling and analytical system; evaporative emissions. April 6, 1994.

86.108-79 Dynamometer. September 12, 1977.

86.109-94 Exhaust gas sampling system; Otto-cycle vehicles not requiring particulate emission measurements. June 5, 1991.

86.110-94 Exhaust gas sampling system; diesel-cycle vehicles, and Otto-cycle vehicles requiring particulate emissions measurements. June 5, 1991.

86.111-94 Exhaust gas analytical-system. June 16, 1993.

86.112-91 Weighing chamber (or room) and microgram balance specifications. June 5, 1991.

86.113-94 Fuel specifications. March 24, 1993.

ADD:

(e) Alcohol-Gasoline Fuel Specifications for 1994 and Subsequent Model-Year Vehicles.

Various alcohol-gasoline fuel blends will be used according to the type of alcohol-fueled vehicle being certified and the particular aspect of the certification procedure being conducted, as specified below.

Fuel additives and ignition improvers intended for use in alcohol test fuels shall be subject to the approval of the Executive Officer. In order for such approval to be granted, a manufacturer must demonstrate that emissions will not be adversely affected by the use of the fuel additive or ignition improver.

- (1) Otto-cycle alcohol vehicles and hybrid electric vehicles which use otto-cycle alcohol engines.

Mileage-accumulation fuel: For methanol, ethanol and hybrid electric vehicles which use otto-cycle methanol or ethanol engines, fuel which meets the specifications listed in Title 13, CCR, Section 2292.1, 2292.2, 2292.3 or 2292.4, as applicable.

Emission-testing fuel: For methanol, ethanol and hybrid electric vehicles which use otto-cycle methanol or ethanol engines, fuel which meets the specifications listed in Title 13, CCR, Section 2292.1, 2292.2, 2292.3 or 2292.4, as modified by the following:

The fuel specification for Title 13, CCR, Section 2292.1 shall be modified to: a) require methanol content at  $98.0 \pm 0.5$  volume percent; b) require ethanol content at  $1.0 \pm 0.1$  volume percent; c) require certification gasoline conforming with specifications noted in paragraph (a) at  $1.0 \pm 0.1$  volume percent.

The fuel specification for Title 13, CCR, Section 2292.3 shall be modified to: a) require ethanol content at  $98.0 \pm 0.5$  volume percent; b) require methanol content at  $1.0 \pm 0.1$  volume percent; c) require certification gasoline conforming with specifications noted in paragraph (a) at  $1.0 \pm 0.1$  volume percent.

The fuel specification for Title 13, CCR, Section 2292.2 and 2292.4 shall be modified to require certification gasoline conforming with specifications noted in paragraph (a) as the hydrocarbon fraction. The vapor pressure specification for the emission-testing fuel shall be adjusted to 8.0 - 8.5 psi., using common blending components from the gasoline stream.

- (2) Alcohol-fueled diesel vehicles and hybrid electric vehicles which use alcohol-fueled diesel engines

Mileage-accumulation fuel: For methanol, ethanol and hybrid electric vehicles which use alcohol-fueled diesel engines, fuel which meets the

specifications listed in Title 13, CCR, Section 2292.1, 2292.2, 2292.3 or 2292.4, as applicable.

Emission-testing fuel: For methanol, ethanol and hybrid electric vehicles which use Otto-cycle alcohol engines, fuel which meets the specifications listed in Title 13, CCR, Section 2292.1, 2292.2, 2292.3 or 2292.4, as modified by the following:

The fuel specification for Title 13, CCR, Section 2292.1 shall be modified to: a) require methanol content at  $98.0 \pm 0.5$  volume percent; b) require ethanol content at  $1.0 \pm 0.1$  volume percent; c) require certification gasoline as noted in paragraph (a) at  $1.0 \pm 0.1$  volume percent.

The fuel specification for Title 13, CCR, Section 2292.3 shall be modified to require ethanol content at  $98.0 \pm 0.5$  volume percent and require certification gasoline conforming with specifications noted in paragraph (a) at  $1.0 \pm 0.1$  volume percent.

The fuel specification for Title 13, CCR, Section 2292.2 and 2292.4 shall be modified to require certification gasoline conforming with specifications noted in paragraph (a) as the hydrocarbon fraction. The vapor pressure specification for the emission-testing fuel shall be adjusted to 8.0 - 8.5 psi., using common blending components from the gasoline stream.

(3) Fuel-flexible vehicles

Mileage-accumulation fuel: For both durability-data vehicles and emission-data vehicles, mileage accumulation shall be conducted with one fuel. For vehicles designed to operate on methanol, a fuel that meets the specifications listed in Title 13, CCR, Section 2292.2 shall be used. For vehicles designed to operate on ethanol, a fuel that meets the specifications listed in Title 13, CCR, Section 2292.4 shall be used. Alternative mileage accumulation fuels and procedures may be used if demonstrated to result in equivalent or more severe deterioration of the vehicle's emission control system, subject to the prior approval of the Executive Officer.

Emission-test fuel: Case (1) For exhaust only emission testing of emission-data vehicles, fuel that meets the specifications listed in Title 13, CCR, Section 2292.2 or 2292.4. For evaporative emission testing, a blend of fuel that meets the specifications listed in Title 13, CCR, Section 2292.2 or 2292.4 and gasoline meeting the specifications of paragraph (a) such that the final blend is composed of either 35 volume percent methanol (plus or minus 1 volume percent of total blend) for methanol- fueled vehicles or

10 volume percent ethanol (plus or minus 1 volume percent of total blend) for ethanol-fueled vehicles shall be used.

Case (2) For the testing required under 86.090(a)(4)(i)(D) of these procedures (durability-data vehicles), exhaust emission tests (exhaust OMHCE or OMNMHCE for non-TLEVs, non-LEVs, and non-ULEVs, exhaust NMOG for TLEVs, LEVs, and ULEVs, exhaust formaldehyde, exhaust CO, and exhaust NO<sub>x</sub>) and evaporative emission tests (evaporative OMHCE) shall be conducted at the specified mileage intervals using: (i) emission testing fuel that meets the specifications listed in subparagraph (e)(1) of this section and (ii) a blend of fuel produced by combining emission-testing fuel that meets the specifications in subparagraph (e)(1) of this section and certification gasoline described in paragraph (a) such that the final fuel is either 35 volume percent methanol (plus or minus 1 volume percent of total blend) and 65 volume percent certification gasoline for methanol-fueled vehicles or 10 volume percent ethanol (plus or minus 1 volume percent of total blend) and 90 volume percent certification gasoline for ethanol-fueled vehicles.

For both Case (1) and (2), alternative alcohol-gasoline blends may be used in place of M35 or E10 if demonstrated to result in equivalent or higher evaporative emissions, subject to the prior approval of the Executive Officer.

- (4) The specification of the fuels to be used under paragraphs (e)(1), (e)(2), (e)(3) and (e)(4) of this section shall be reported in accordance with 86.090-21(b)(3) or 86.091-21(b)(3).

ADD:

(f) Gaseous Fuel Specifications for 1994 and Subsequent Model Year Vehicles.

- (1) Dedicated gaseous- and dual-fueled vehicles and hybrid electric vehicles which use liquefied petroleum gas

Mileage accumulation fuel: Liquefied petroleum gas meeting the specifications listed in Title 13, CCR, Section 2292.6 shall be used in service accumulation.

Emission-test fuel: Liquefied petroleum gas meeting the specifications listed in Title 13, CCR, Section 2292.6 shall be used for exhaust and evaporative emission testing with the following exceptions: a) propane content limited to  $93.5 \pm 1.0$  volume percent; b) propene content limited to

$3.8 \pm 0.5$  volume percent; c) butane and heavier components limited to  $1.9 \pm 0.3$  volume percent.

- (2) Dedicated gaseous- and dual-fueled vehicles and hybrid electric vehicles which use natural gas

Mileage accumulation fuel: Natural gas meeting the specifications listed in Title 13, CCR, Section 2292.5 shall be used in service accumulation.

Emission-test fuel: Natural gas meeting the specifications listed in Title 13, CCR, Section 2292.5 as modified by the following: a) methane content limited to  $90.0 \pm 1.0$  mole percent; b) ethane content limited to  $4.0 \pm 0.5$  mole percent; c)  $C_3$  and higher hydrocarbon content at  $2.0 \pm 0.3$  mole percent; d) oxygen content at 0.5 maximum mole percent; e) inert gases (sum of CO and  $N_2$ ) content at  $3.5 \pm 0.5$  mole percent.

- 86.114-94 Analytical gases. June 5, 1991.
- 86.115-78 EPA urban dynamometer driving schedules. April 6, 1994.
- 86.116-94 Calibrations, frequency and overview. July 1, 1994.
- 86.117-96 Evaporative emission enclosure calibrations. March 24, 1993.
- 86.118-78 Dynamometer calibration. January 7, 1988.
- 86.119-90 CVS calibration. April 11, 1989.
- 86.120-82 Gas meter of flow instrumentation calibration, particulate measurement. March 5, 1980.
- 86.121-90 Hydrocarbon analyzer calibration. April 11, 1989.
- 86.122-78 Carbon monoxide analyzer calibration. June 28, 1977.
- 86.123-78 Oxides of nitrogen analyzer calibration. November 1, 1993.
- 86.124-78 Carbon dioxide analyzer calibration. June 28, 1977.
- 86.125-94 Methane analyzer calibration. June 5, 1991.
- 86.126-90 Calibration of other equipment. April 11, 1989.

- 86.127-96 Test procedures; overview. March 24, 1993.
- 86.128-79 Transmission. March 24, 1993.
- 86.129-94 Road load power test weight and inertia weight class determination. March 24, 1993.
- 86.130-96 Test sequence; general requirements. March 24, 1993.
- 86.131-96 Vehicle preparation. March 24, 1993.
- 86.132-96 Vehicle preconditioning. April 6, 1994.

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ADD:

(c)(1) For hybrid electric vehicles, the battery pack shall be discharged to or just below the state-of-charge at which operation of the auxiliary power unit will be initiated by the vehicle's control strategy. One UDDS shall be used for preconditioning. If the auxiliary power unit is capable of being manually activated (which would cause the vehicle to be classified as a Type C HEV), the auxiliary power unit shall be activated at the beginning and throughout the emission test.

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- 86.133-96 Diurnal emission test. March 24, 1993.
- 86.134-96 Running loss test. March 24, 1993.
- 86.135-94 Dynamometer procedure. June 5, 1991.
- 86.136-90 Engine starting and restarting. March 24, 1993.
- 86.137-96 Dynamometer test run, gaseous and particulate emissions. March 24, 1993.
- 86.138-96 Hot soak test. March 24, 1993.
- 86.139-90 Diesel particulate filter handling and weighing. April 11, 1989.
- 86.140-94 Exhaust sample analysis. June 5, 1991.
- 86.142-90 Records required. April 11, 1989.



- 86.143-96      Calculations; evaporative emissions. March 24, 1993.
  - 86.144-94      Calculations; exhaust emissions. June 5, 1991.
  - 86.145-82      Calculations; particulate emissions. November 2, 1982.
  - 86.146-96      Fuel dispensing spitback procedure. March 24, 1993.
  - 86.150-98      Overview; refueling test. April 6, 1994.
  - 86.151-98      General requirements; refueling test. April 6, 1994.
  - 86.152-98      Vehicle preparation; refueling test. April 6, 1994.
  - 86.153-98      Vehicle and canister preconditioning; refueling test. April 6, 1994.
  - 86.154-98      Measurement procedure; refueling test. April 6, 1994.
  - 86.155-98      Records required; refueling test. April 6, 1994.
  - 86.156-98      Calculations;
- Title 40, Part 86, Appendix I (Urban Dynamometer Schedules). March 24, 1993.